

formed by a predetermined gap, as is done in the first substrate, is divided into two areas as right and left areas thereby horizontal wiring lines 32A and 32B are formed to have matrix form with the vertical wiring lines 22A and 22B.

[0070] In addition, the horizontal wiring line 50 for noise detection is formed at an interface between the two areas in the second substrate. The area of the horizontal wiring line 50 for noise detection, as is done in the first embodiment, is set to a detecting area resulted from that a sum of areas overlapping between the vertical wiring lines 22A (or vertical wiring lines 22B) and one of the horizontal wiring lines 32A (or horizontal wiring 32B) crossing the vertical wiring lines 22A (or vertical wiring lines 22B) is subtracted from the area of the one of the horizontal wiring lines 32A (or horizontal wiring 32B).

[0071] In the present embodiment, the same effect as the first embodiment can also be obtained. In addition, the vertical wiring lines and the horizontal wiring lines are divided into two areas thereby multilayered interconnections can be designed for completing mounting single detecting circuit or two detecting circuits formed in the respective areas.

#### Third Embodiment

[0072] Next, FIG. 7 shows a structure of the pressure-sensitive capacitive sensor according to a third embodiment of the invention.

[0073] FIG. 7A is a plan view of the sensor unit of the capacitive sensor, and FIG. 7B is a cross-sectional view taken along line D-D' of FIG. 7A.

[0074] The capacitive sensor according to the third embodiment differs from the capacitive sensor according to the second embodiment in that vertical wiring lines and horizontal wiring lines are divided into two areas having the inclined area used as an interface area between the two areas, thereby the wiring lines are disposed in a matrix, and the horizontal wiring line 60 for noise detection is formed at a position corresponding to the interface area between the two areas in the second substrate 30 not to cross the vertical wiring lines. Since the rest structures are the same as those of the fourth embodiment, the descriptions thereabout will be omitted.

[0075] In FIG. 7, the first substrate 20 is divided into two areas with the inclined area used as the interface area, and the vertical wiring lines 22C and 22D are formed in a way that the lengths of the vertical wiring lines are changed stepwise on the film 21.

[0076] In addition, the second substrate 30 facing the first substrate 20 where the vertical wiring lines are formed with a predetermined gap interposed therebetween, as described in the first substrate 20, is divided into two areas with the inclined area as the interface area, and the horizontal wiring lines 32C and 32D are formed in a way that the lengths of the vertical wiring lines are changed stepwise on the film 21, thereby forming a matrix.

[0077] In addition, in the second substrate 30, a horizontal wiring line 60 for noise detection is shaped like a step at the interface area between the two areas. The area of the horizontal wiring line 50 for noise detection, as described in the second embodiment, is set to a detecting area, the area

of one horizontal wiring lines 32C (or horizontal wiring 32D) subtracted by the sum of the areas, at which the vertical wiring lines 22C (or vertical wiring lines 22D) and the horizontal wiring lines 32C (or horizontal wiring 32D) cross each other in a horizontal wiring 32C (or horizontal wiring lines 32D).

[0078] In the embodiment, the same effect as that of the second embodiment can be obtained.

#### Fourth Embodiment

[0079] Next, FIG. 8 shows a structure of the pressure-sensitive capacitive sensor according to a fourth embodiment of the invention. FIG. 8A is a plan view of the capacitive sensor, and FIG. 8B is a cross-sectional view taken along line E-E' of FIG. 8A.

[0080] As shown in FIG. 8, in the pressure-sensitive capacitive sensor 1 according to the fourth embodiment of the invention, like the capacitive sensor of the first embodiment, a first substrate 20 where a plurality of vertical wiring lines 22 is formed and a second substrate 30 where a plurality of horizontal wiring lines 32 is formed face each other with a space provided by the spacer 45, and the vertical wiring lines 22 and the horizontal wiring lines 32 are disposed in a matrix. The matrix portion of the vertical wiring lines 22 and the horizontal wiring lines 32 constitutes a sensor unit.

[0081] The capacitive sensor according to the fourth embodiment differs from the capacitive sensor according to the first embodiment in that a horizontal wiring line 70 for noise detection is shaped like the horizontal wiring 32 on the second substrate 30, and a shield plate 80 (shield layer) for shielding the noise is disposed with the vertical wiring lines 22 in the first substrate 20. In addition, the shield plate 80 has an opening 80A, through which the portion corresponding to the detecting area of the horizontal wiring line 70 for noise detection is exposed. Since the rest structures are the same as those of the fourth embodiment, the descriptions thereabout will be omitted.

[0082] Therefore, according to the capacitive sensor of the embodiment, in addition to the effect obtained by the first embodiment, a wiring width limit (design rule) of the horizontal wiring line 70 for noise detection can be the same as that of the horizontal wiring 32 (detecting wiring) or the vertical wiring 22 (driving wiring), thereby the cost limit can be reduced.

#### Fifth Embodiment

[0083] Next, FIG. 9 shows a structure of the pressure-sensitive capacitive sensor according to a fifth embodiment of the invention. FIG. 9A is a plan view of a sensor unit of the capacitive sensor, and FIG. 9B is a cross-sectional view taken along line F-F' of FIG. 9A.

[0084] As shown in FIG. 9, in the pressure-sensitive capacitive sensor 1 according to the fifth embodiment of the invention, like the capacitive sensor of the fourth embodiment, a first substrate 20 where a plurality of vertical wiring lines 22 is formed and a second substrate 30 where a plurality of horizontal wiring lines 32 is formed face each other with a space provided by a spacer 45, and the vertical wiring lines 22 and the horizontal wiring lines 32 are